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## THE SPRINGS OF SOUTHERN NEVADA.

BY D. A. LYLE, U. S. A.

IT is the intention of the writer to merely jot down a few personal recollections of some of the springs visited in the arid region of Southern Nevada, while a member of one of the Wheeler expeditions.

To those who have experienced the pangs of thirst, while journeying over the desolate wastes that characterize this section, it will not be surprising that reminiscences of water should linger longest in the memory of the traveler. In fact the procurement of that necessity is a matter of such vital importance that all movements are subordinated and controlled by the answer to

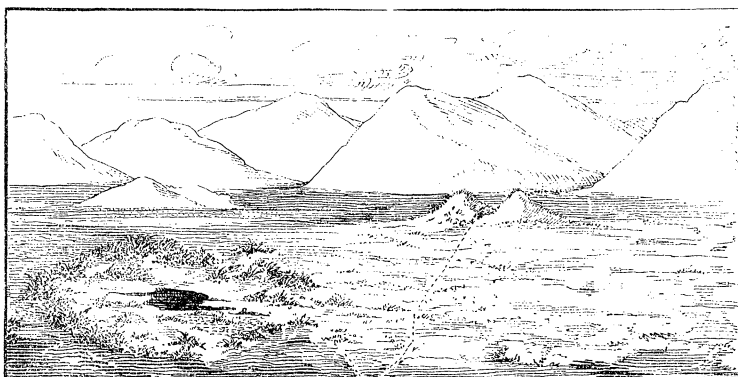
*Fig. 1. Mud Spring.*

the question, "Is there any water there?" Should the reply be in the negative, some other route must be followed, or else a supply of water must be carried along. The springs in this portion of the Great Basin are few, and often far between. Their waters differ much in quantity, temperature and chemical composition. In quantity, the yield varies from a few gallons per day to a never failing supply. As to temperature, the heat of the waters range through cold, cool, tepid and warm to boiling. As regards chemical composition, some are fresh, others alkaline, and still others, sulphurous. In the waters of some springs, a mere trace of saline ingredients are found, while in other cases the salts are present in sufficient quantity to produce saturation.

The first that will be mentioned are Mud Springs (Fig. 1), also

known as Desert Wells, from the fact that parties passing that way, have dug pits from four to eight feet deep when there, in search of more water. These springs, when visited by the writer, were mere pools of muddy slime, with a slight film of stagnant water overlying the viscous blue marsh. So nauseous were these waters that neither men nor animals could drink them. Enough water, however, was obtained by digging new pits or "wells" near by, to partially alleviate the sufferings of man and beast, which were somewhat intense after marching over thirty miles through the heated sands of the Smoky Valley Desert upon a July day.

These springs—if springs they may be called—were situated at the southern extremity of Smoky Valley surrounded by a dreary waste of sand and "alkali flats," with here and there a stunted sage bush.



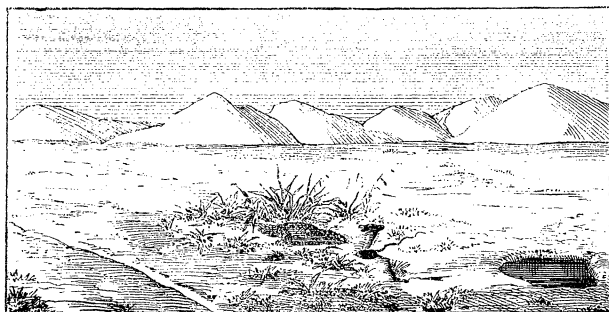
*Fig. 2.*

Day break the following morning found the party en route to Silver Peak, the next objective point. Silver Peak, a small mining camp, is located near the west side of Clayton Valley, and at the eastern base of the Red Mountain range. Near this place and along the western border of the salt marsh which forms the major part of the basin are the Thermal Springs. The more important ones are eleven in number. With one exception they are contained in a narrow belt, running almost north and south. This belt is about a half mile in length, its width being but a few rods. Beginning at the southern limit of this line, the first spring we encounter is in a small depression in the general surface. (Fig. 2.) Its waters are slightly saline, but quite palatable, and are the best for use in the vicinity. The

temperature of the water is  $69^{\circ}$  Fahr. Just north of this is found a cluster of springs; the largest and most central one is called Saturn. (Fig. 3.) Their temperatures are  $69.5^{\circ}$  Fahr. These springs are in close proximity to each other, and flow out upon a level area some twenty acres in extent, covered with a rank growth of coarse salt grass, from whence the water flows into the salt marsh.

Proceeding northward, we next meet with three salt springs arranged in the form of an isosceles triangle, differing widely in temperature and the degree of their saturation.

These are situated in the edge of the salt marsh, the two forming the base, being in an east and west line, twenty feet apart. The more westerly one has a temperature of  $79^{\circ}$  Fahr., while the other one in its quiescent state has a temperature of  $117.8^{\circ}$  Fahr., and at irregular intervals boils and emits steam. The third,



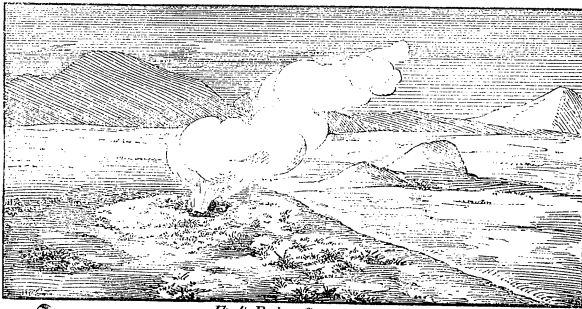
*Fig. 3 Saturn Springs.*

forming the apex of the triangle and lying ninety feet north, has a temperature of  $116.5^{\circ}$  Fahr.

Still further north are two more salt springs, situated also in an east and west line, only four feet apart; the westerly one, as before, having the lowest temperature, being  $79^{\circ}$  Fahr., while the other has a temperature of  $117^{\circ}$  Fahr. Another spring (Fig. 4), about one fourth of a mile north of the others, was constantly boiling and emitting steam. A gurgling noise could be heard in several places near the main opening, under the tufaceous crust of calcareous matter deposited by its waters. In approaching this spring the greatest caution had to be exercised to avoid breaking through the crust of tufa which bridged and in part, concealed the seething waters, which could be seen through the many perforations in this treacherous envelope. Every step in

advance was carefully tested by striking the tufa with a mining hammer, to see if it would bear the weight of a man. Thus, by slow degrees one or two members of the party succeeded, without accident, in reaching the main opening, which was about five feet in diameter. Regard for personal safety, however, soon overcame scientific curiosity, and the retreat was accomplished by separate routes in the same cautious manner, to avoid getting too much weight upon any one place. The waters were found to be impregnated with soda, lime and borax.

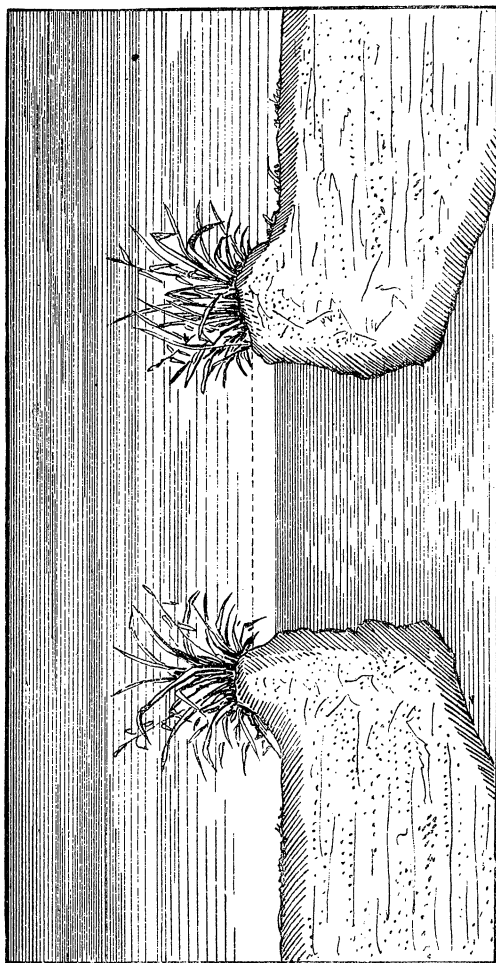
In the immediate vicinity of the hot springs were found numerous concretions, either on the surface or slightly imbedded. These had generally a prolate spheroidal form, although many eccentric shapes were seen. About half a mile out in the salt marsh was a remarkable spring (Fig. 5), nearly twenty feet in diameter. The water rose to the height of several inches above



*Fig. 4. Boiling Spring.*

the general surface, and was retained by a ring of earth elevated a foot above the terrain and thickly set with *tules*, a kind of rush, whose verdancy contrasted strangely with the sombre gray around, and gave to it the appearance of a miniature oasis. The water was quite clear and nearly fresh; this latter property was probably only apparent from the contrast, after imbibing the more brackish water of the other springs; its interior cylindrical walls extended to a depth of about five feet, below and under which, as far as could be reached by a pole, nothing like earth could be felt. There appeared to be a subterranean lake beneath the salt-marsh, of which this spring was the only visible portion. As to its depth we had no means of determining it; the temperature was 69° Fahr. The circumjacent earth was a mere superficial crust, five or six inches thick, which was springy beneath our tread, and breaking through which one sank into the viscous

mud. In walking over this area the ground constantly jarred and



*Fig. 5. Section of Spring in Salt Marsh.*

trembled, thus indicating the elasticity and instability of the indurated envelope. Even on the road near our camp, west of the marsh, when animals traveled over it, a dull, hollow sound was heard, bearing out the hypothesis of the existence of a subterranean cavity. The plain is crossed in two or three places by roads and trails; and should animals get off these, they breakthrough and often become submerged in the mire. At one or two places shallow trenches or vats have been scooped out, and the salt water collecting and evaporating in

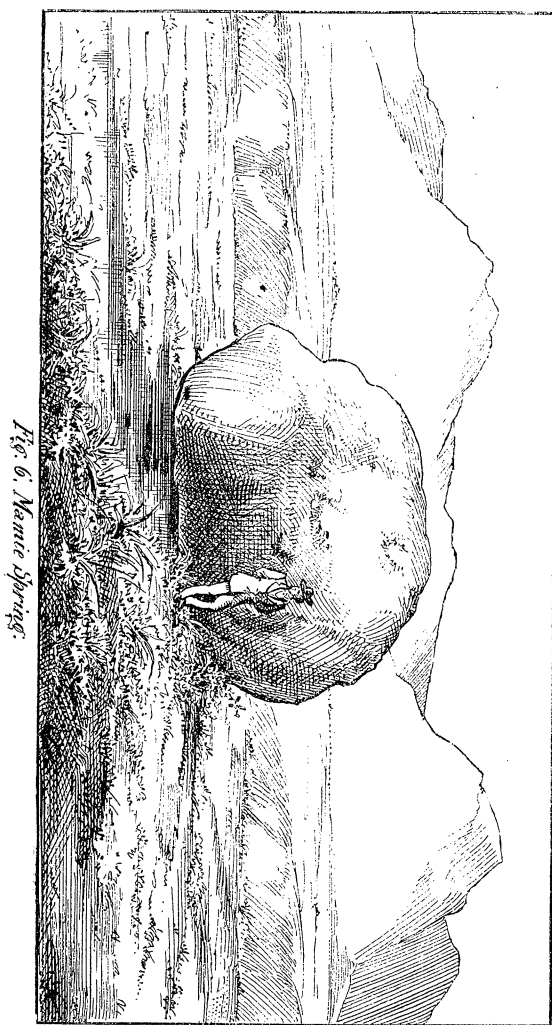
them leaves the walls and bottoms covered with beautiful crystals of pure salt.

Traveling westward from Silver Peak, a distance of eleven and three-fourth miles, during which the Red Mountain range is crossed, Mountain Spring is reached. This spring bubbles up at the foot of Red Mountain peak. The water is clear, cold and not in the slightest brackish. Its appearance was hailed with joy by men and animals. At last water had been found that would slake instead of increasing thirst. Here, in the short interval of less

than ten miles, the physical characteristics of the water supply had radically changed.

On the east side of the Red Mountain range the springs were thermal, brackish, and often nauseating, while on the western slope they were pure, cold and refreshing.

A few miles west of Red Mountain Spring, in a dry ravine,



*Fig. 6. Mamie Spring.*

through which the traveler passes to reach Fish Lake Valley, is found Mamie Spring. (Fig. 6.) The water is excellent and plentiful. Its situation is rather unique. In the bottom of a dry wash lies

a very large boulder of conglomerate, or more strictly of breccia,



*Fig. 2. "Mound" Springs.*

transported from some distance, from the under side of which the water of the spring gushes into a little pool or basin it has made for itself. From this basin the water, overflowing, traverses for a few yards the gravelly bed of the wash, when it sinks and is seen no more. The huge boulder that shadows this little basin with its overhanging edge is mainly composed of a very hard arenaceous matrix, in which are seen imbedded many rounded pebbles of various sizes, and also large angular fragments of rock. The most remarkable thing about this spring was the fact that it

had only been running about two years, having suddenly sprung into existence, the miners said, since they had been in the vicinity.

Upon the eastern edge of the Amargosa Desert is quite a large area called Ash Meadows; so named from a small species of ash tree growing there. The meadows are covered with good grass and are well watered by numerous warm springs.

The principal spring was about thirty feet in diameter and situated at the foot of a small butte. The water issued from the bottom, through a tufaceous mass of rock.



It was about four or five feet deep and was cooler than the other springs. The stream of water that flowed out was five inches deep and two feet wide, and clear as crystal. The sides and bottom of this spring were covered with a white, chalky-looking deposit, that gave a milky tinge to the water when stirred up. A few small fish were seen in this spring. Many of the springs in this vicinity contained quicksand.

South-east of Amagoza is Pah-rimp Desert. About the middle of the upper end of this dreary waste of sand and sage bushes are several little oases bountifully watered with exhaustless springs, some of which are very large, and the confluence of their waters forms quite a large creek that flows off towards the south-west, but is soon lost in the sand. Splendid grass abounds along the banks of this water course. Immediately around the springs a band of southern Pah-Ute Indians is located, and by irrigation succeeds in raising a quantity of corn, squashes and watermelons. Willow trees and wild grapes are indigenous, the latter growing in the greatest abundance.



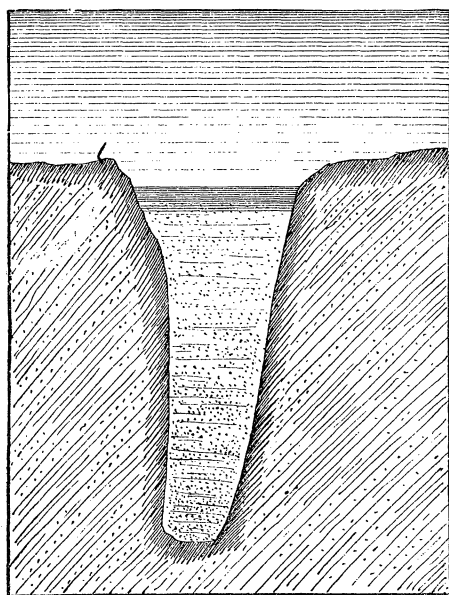
*Fig. 8. Las Vegas Springs*

Mound Springs. (Fig. 7.) By this appellation it is proposed to designate those springs situated upon small mounds rising above the general surface of the country surrounding them. The most prominent mound noticed by the writer was upon the Vegas plains in Southern Nevada; its base was circular and

about twenty-five feet in diameter, it was fifteen feet in height and was covered with "tules" and coarse grass. Several small sulphur springs oozed from its nearly flat top, and provided moisture for the tangled vegetation.

It appeared as if built up by the partial decay of organic matter and the depositions of these numerous springlets. The soil was tremulous and yielding to the tread, and resembled in that particular the sphagnous bogs of Alaska. The fumes of sulphuretted hydrogen were strongly apparent even at some distance from the mound.

A short distance beyond the mound above-mentioned, occurred the Las Vegas Springs (Figs. 8, 9), the largest of which was ap-



*Fig. 9. Section of large Spring Fig 8.*

parently about three feet deep, with white quicksand constantly "boiling up" from the bottom. Quite a large creek issued from it and ran in a south-easterly direction for a mile or more. This spring had been regarded by the Indians and squatters as a rather supernatural one, and among other improbable legends was said to be bottomless. This myth, at least, was exploded when a sixty pound weight tied to a cord was used to sound its depth. This weight sank eighteen feet and three inches through the ever

varying quicksands, and then came to rest. Further on ran the other springs which also poured their waters in the creek flowing from the first one. On the left bank of this creek stood an old *adobe* enclosure, rectangular in shape, built by the Mormons some years before.

Two or three large cottonwood trees shaded the creek near the quadrangle. Here the bed of the stream was broken into a series of little rapids or falls, none exceeding four feet in height, formed by rocks of calcareous tufa.

At the foot of these miniature waterfalls was a quiet pool, about five feet deep and ten feet in diameter, used in former times by the Mormons as a baptismal font. The land along the banks of the creek had been cultivated, and at this time were seen the remains of irrigating ditches, which attest the industry and enterprise of this strange, and to our minds, deluded people. These fields are now overgrown with mesquite and thistles, the latter attract numberless goldfinches, humming birds and humble bees.

In the springs above enumerated, the reader has a sketch of a few of those in Southern Nevada. The springs of this inhospitable region are so few, that at one time or another, each one becomes, as it were, the polar star of the desert traveler, towards which he turns his face with inflexible determination.

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## THE NIGHT HERONS, AND THEIR EXODUS.

BY REV. SAMUEL LOCKWOOD, PH.D.

**A**MONG our showy birds, although far from graceful in many of its movements, is the night heron (*Nyctiardea gardeni* Baird). If fine feathers make a fine bird, then assuredly our *Nyctiardea* deserves consideration. The bird when adult is fully two feet long. It has a deep guttural cry, consisting of one syllable, slowly repeated. This circumstance afforded the old name given it by Nuttall, *Ardea discors*, as also its popular names of qua-bird, or quawk. It is also known as the black-crowned night heron, the crown of the head, and considerable of the back being a very dark green, almost approaching black. In the nuptial months, the bird flourishes from the hinder part of the head, flowing backwards, like so many natural "accidentals," three very delicate white